O-0204

LOCATE A POINT ON A MAP USING LATITUDE AND LONGITUDE

CONDITIONS

Given an aeronautical chart, road map, or topographical map with latitude and longitude lines. You are away from mission base, mounted or dismounted, and must locate your location on map in order to report your location to mission base, an aircraft or another ground element using latitude and longitude. Or, you are coordinating with another search element (ground or air) who has told you his location using the latitude and longitude. You want to plot this point on your map.

OBJECTIVES

Within 1 minute, the team member announces the correct latitude and longitude of the marked point (using the smallest gradiations of latitude and longitude printed on the map), using correct terminology, and, within 1 minute, can plot a point on the map given the latitude and longitude orally.

TRAINING AND EVALUATION

Training Outline

1. Latitude and longitude are the objective position measurements used on aeronautical charts. Many road maps and topographical maps also are gridded using this system.

a. Lines of longitude run north-south on the map. Lines of latitude run east-west.

b. Both latitude and longitude are measured in degrees, minutes and seconds. One minute is 1/60th of a degree, and one second is 1/60th of a minute. In the continental US, latitude numbers are read from south to north (bottom to top), and longitude numbers are read from east to west (right to left)

c. Each line of latitude is labeled as either North (if it is above the equator) or South (if it is below the equator). Each line of longitude is labeled as East (if it is east of a longitude line called the Prime Meridian) or West (if it is west of the Prime Meridian)

d. To read a lat-long coordinates the symbol " ° " means degrees, an apostrophe (" ' ") means minutes, and a double apostrophe (" " ") means seconds. Always read the latitude before the longitude.

e. Example: 32° 33' 44" N, 45° 12' 52" E means "32 degrees, 33 minutes, and 44 seconds North Latitude, 45 degrees 12 minutes and 52 seconds East Longitude"

f. On larger scale maps, or when pinpoint accuracy is not required, seconds are not used. For example, 45° 12' N, 22° 36 W is read as "45 degrees, 12 minutes North Latitude, 22 degrees 36 minutes West Longitude."

2. To find the lat-long designation of a known point on the map

a. Find the latitude:

1) Find the numbers of the latitude degree lines to the immediate north and south of the point. Write down the lower of the two. (For example, if the point is between 45° and 46° North latitude, write down

"45°". Also write down if that latitude line is labeled as "North" or "South" (above the equator it will always be "North").

2) From latitude line chosen above, count up the number of minutes that the point is from the line using the tick marks on the edge of the map (or in the grids if the map is gridded) until you reach the last minute marking before your point. Write down the number of minutes.

3) From the last minute mark, count up the number of seconds to your point (if the map is of a large scale, such as an aviation chart, it will not have marks for seconds. Either stop with the minute measurement, or estimate seconds). Write down the number of seconds.

b. Find the longitude.

1) Find the numbers of the longitude degree lines to the immediate east and west of the point. Write down the lower of the two. (For example, if the point is between 22° and 23° West latitude, write down " 22° "). Also write down if that latitude line is labeled as "East" or "West" (in the western hemisphere it will always be "West").

2) From longitude line chosen above, count left the number of minutes that the point is from the line using the tick marks on the edge of the map (or in the grids if the map is gridded) until you reach the last minute marking before your point. Write down the number of minutes.

3) From the last minute mark, count left the number of seconds to your point (if the map is of a large scale, such as an aviation chart, it will not have marks for seconds. Either stop with the minute measurement, or estimate seconds). Write down the number of seconds.

c. NOTE: If the map is not marked with minutes or seconds, you will have to estimate. Remember, there are 60 minutes in a degree and 60 seconds in a minute. So, if the point is halfway between two degrees, it is at the 30 minute point. If it is one quarter the distance from one degree to another, it is at the 15 minute point. Use the same logic to determine seconds if the map is only gradiated in degrees and minutes.

c. Make sure the lat-long coordinate you have written down is in the format Degrees°, Minutes', Seconds" (North or South) Latitude, Degrees°, Minutes', Seconds" (East or West) Longitude,

3. To plot a point given the lat-long coordinate:

a. Find the correct latitude line and count up the correct number of minutes and seconds (below the equator you would count down, not up).

b. Find the correct longitude line and count left the correct number of minutes and seconds (in the eastern hemisphere you would count right, not left).

c. Mark the point.

Additional Information

More detailed information on this topic is available in Chapter 5 of the Ground Team Member and Leader Reference Text.

Evaluation Preparation

Setup: Mark a point on a map or chart gridded with latitude and longitude, and give the map to the student. . Tell him whether or not she must report seconds, or just degrees and minutes (depends on the scale of the map). Pick a different grid location from the point and write down the latitude and longitude coordinates. Ensure you have a timer. Because this task is timed, it is necessary to make sure that the student and work area is prepared for testing. The map should be open and complete. If copies of maps are used, they should include all references normally available on the full map to take the exam.

Brief Student: Ask the student if s/he is prepared. Tell the student to tell you the latitude and longitude of the point. Then orally give him the latitude and longitude you wrote down and tell him to show you where that point is on the map.

Evaluation

Performance Measures	Results	
Determining the grid of a known point. The student:		
1. Announces the correct latitude degrees, minutes and seconds within tolerance (see below)	P	F
2. Announces the correct latitude designation "North" or South"	P	F
3. Announces the correct longitude degrees, minutes and seconds within tolerance (see below)	P	F
4. Announces the correct longitude designation "East" or "West"	P	F
5. Performs the above steps within 1 minute of time	P	F

NOTE: The minimum accuracy for this task is to be within 30 seconds of the correct answer for a map gradiated in minutes. If the map is large enough scale to be gradiated in seconds, then the needed accuracy should be increased. For dismounted work, a ground team with proper maps should be able to plot positions within 10 seconds.

The individual determines the location of a designated grid:		
6. Plots a point on the map within 1 minute using the correct latitude and longitude degrees, minutes and seconds within tolerance (see accuracy note above).	P	F

Student must receive a pass on all performance measures to qualify in this task. If the individual fails any measure, show what was done wrong and how to do it correctly.